S O I L C O N S E R V A T I O N D I G E S T

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WHY FARM ERODED SOIL?

By Cornelius C. Ullman
Agronomy Division, Regional Office

It is generally recognized that eroded soils yield less and are less profitable to farm than lands which still retain their fertile topsoil. However, in the past farmers have not been in possession of accurate figures showing what yields may be expected from farming subsoils or seriously eroded areas.

Lower Yields From Eroded Soils

Yield studies conducted by the Soil Conservation Service in the Las Posas project during the past cropping season (1935-1936) indicate lower lima bean yields on soils suffering from soil erosion. However, as these studies cover but a single season they should not be taken as conclusive evidence of the absolute effect of soil erosion on crop production. Seasonal variations in temperature, rainfall and cultural practices are some of the factors, in addition to the degree of soil erosion, which may seriously influence crop yields. With a continuation of this investigation over several years such variations will be properly weighted.

Plant Nutrients Lost

It should be mentioned before proceeding that soil erosion includes not only the physical loss of the soil but also involves the loss by leaching and run-off of the valuable plant nutrients on which the life of the plant depends. In considering the data which are presented and analyzed herein, it should be remembered, then, that a figure or statement of the degree of erosion includes more than merely the loss of the surface soil.

Plots Selected

In conducting these yield studies, areas, designated as plots, were selected in bean fields on dry-farmed land located within the Las Posas Project. By selecting such field plots so that conditions were similar excepting the degree of erosion, any difference on comparison of the yields from such plots should indicate the effects of erosion on yields.

The bean yield from Plot 1 (70 percent of the surface or topsoil lost) amounted to 428 pounds per acre. On the very severely eroded area of Plot 2 (100 per-

cent of the surface soil lost, erosion into the subsoil, gullied), and similar in all other respects to Plot 1 with exception of the degree of erosion, a yield of only 99 pounds per acre was recorded. This is a reduction of 329 pounds per acre between soils of moderately severe and very severe degrees of erosion. Farmers state that such land ten to twenty years ago produced 700 to 1000 pounds of beans to the acre. In comparisons B and C a reduction in bean yields of 289 pounds or 36 percent and 771 pounds or 72 percent per acre, respectively, were noted between the plot areas of lesser and greater intensities of erosion.

Reduction of 329 Pounds Per Acre in Yields

Losses from Plots from which 100 percent of the surface soil was removed ranged from $10.67 to $23.24 per acre. In arriving at these figures the price for beans and straw per hundredweight was assumed to be $6.20 and $0.31, respectively, and the cost of production on dry-farmed land to be $30 per acre. Cost figures include labor, depreciation, materials, etc. The calculated net returns per acre of beans and straw are as follows:

COMPARISON A	Plot 1 (Moderate severe erosion)	$-2.06 loss
	Plot 2 (Very severe erosion, gullied)	-23.24 loss
COMPARISON B	Plot 3 (Moderate erosion)	$22.43 profit
	Plot 4 (Moderate severe erosion)	4.19 profit
COMPARISON C	Plot 5 (Moderate severe erosion)	$39.85 profit
	Plot 6 (Very severe erosion)	-10.67 loss

Relatively, the continuation of bean farming on such land as represented by Plots 1, 2, and 6, seems anything but desirable. Profits derived from the less eroded and more profitable areas of the farm would be decreased by the losses incurred in farming the more severely eroded parts. It should also be realized that lands with moderate erosion now returning good yields and profits are becoming less profitable to operate with the loss of every inch of topsoil. Of course some soils are subject to greater washing than others and if cooperators within the demonstration area desire to do so they can check with Soil Conservation Service representatives as to the soil types on their properties and the amount of erosion that has taken place.

The loss of topsoil can usually be identified by color variations occurring on a hillside due to the lighter or brighter color of the exposed subsoil. Gully erosion can be recognized as channels that are not removed by normal tillage operations. Following heavy storms the evidences of erosion are plainly visible.

The washing away of a few inches of topsoil, no matter under what circumstances, should be of immediate concern to the farmer. Such losses can never be replaced within his lifetime. Buildings and implements old or worn-out may be replaced by new purchases, but money cannot buy back the loss of good topsoil with its rich store of plant food material.

Topsoil is Farmer's Capital

The topsoil is the farm operator's and farm Owner's investment just as much as the stocks of canned goods and staples lining grocery store shelves are the grocer's. There is, however, one important difference between the farm group and the grocer group. The grocer may lose his entire investment--stock, building, and equipment--by such agencies as fire, flood, or earthquake, but still suffer no irreparable loss. He can carry insurance to cover these losses. The farmer, on the other hand, carries no insurance against the loss of his investment--the topsoil. He must insure himself from loss by the proper use of his land and adequate soil conservation practices. Contour tillage and cultivation, green manuring, crop rotations, the retirement of erodible land to pasture or woodlot, and the construction and maintenance of terraces, dikes, and dams, are a few of the protective measures which may be considered in outlining an insurance program for soil conservation.

Such practices may require additional expenditures for labor, materials, and equipment, but failure to protect sloping clean-cultivated fields from soil erosion will in most instances result in lower yields and reduced profits.

SEEDING AROUND STRUCTURES
SEBASTOPOL PROJECT

Seeding around erosion control structures is one phase of vegetative control that is apt to pass unnoticed. Yet it plays a considerable part in curtailing soil washing. Where natural vegetation has been disturbed by excavation for dams and outlet structures a certain amount of washing is apt to take place.

Sod Established

In the Sebastopol project seeding of such ground has proven the most practical method of solving this problem. Where newly formed earth fills around a structure were seeded in the early spring a well-established sod is now found. This sod not only protects the structure but the area around it as well. -- By P. L. Stanley, Agronomist, Sebastopol ECW Camp.

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SIXTY ON TOUR
LAS POSAS PROJECT

Three buses with 60 Ventura County ranchers and businessmen toured the 40,000 acre Soil Conservation Service demonstration area in the Las Posas the afternoon of November 17.

Soil-Saving Machines

Highlight of the tour was a demonstration of four soil- and moisture-saving machines, - a disc ridger, a hole-digger, and two basin-listers. One of the listers makes 3000 basins to the acre and it is estimated that a field treated in this manner will take care of a two inch rain.

Ranchers and others who visited the project came from the following communities: Santa Paula, Moorpark, Camarillo, Oxnard, Carpinteria, Fillmore, Ojai, Simi, Santa Susana, and Ventura.

TOURS PROVE WORTHWHILE

Tours are conducted by farm advisors or county agents over demonstration projects. These tours are arranged for the visual instruction of farmers whose lands are suffering from erosion.

Invitations Extended

Farmers are invited to attend these tours. Those who do attend express themselves that the tours are very much worthwhile. Others will attend when the importance of the erosion control problem is brought to their attention.

Erosion Problem

Many farmers have been convinced that there is a real erosion problem on their lands. Some because there has been a continuous reduction in yield or a lowering of quality. Others because they have observed deposits of soil on lower lands and still others because dams which have been constructed in gullies rapidly fill with eroded soil that obviously washed off the lands above. Muddy waters during and following a heavy rain, silt deposited on highways, deep rills on sloping lands, and exposed rocks on cultivated fields evidence erosion.

Control measures are shown on these tours. Explanations are made and farmers have the opportunity of visualizing similar control measures on their own farms.

Result of Tours

One ranch manager after a tour remarked that he had obtained ideas that would save his company $2000 on operations this year.

Others on completing a tour have requested assistance from the farm advisors to help with control measures on their own lands. Farm advisors may call on the technical staff of the Soil Conservation Service to plan erosion control methods on properties outside of demonstration projects.

Help Offered

The Soil Conservation Service is desirous of assisting farmers who at their own expense will carry out erosion control measures. It should be apparent to all that if all farmers waited until demonstration projects were established to include their lands, many years would elapse before their properties would be reached. Where erosion is serious control methods should be installed without delay.

FARMERS AID SOIL CONSERVATION SERVICE IN MEASURING RAINFALL

By Leonard Schiff, Assistant Hydraulic Engineer

Rainfall records are becoming increasingly important in modern agriculture. Such information is being applied to conservation of soil and moisture, as the amount, intensity, and distribution of rainfall is a deciding factor in the selection of efficient conservation measures.

Thirty-one Gages Read

Fully realizing the value of this information farmers in the Las Posas project are aiding the Soil Conservation Service in measuring the amount of rain falling on the area. There are 31 gages being read, six of which are recording gages designed to measure the intensity or quantity of rain falling in a given period of time.

GAGING STATIONS

Ranch or Locality	Cooperative Observer
Thille	J. N. Thille
Agoure	Miss A. Agoure
G. W. & R. Mahan	G. W. Mahan
Stockton	J. P. Scott
Bianchi	J. Pelerino
B. I. Co.	J. Smith
Culbert	B. Culbert
Snyder	F. A. Snyder
McFarland	T. F. McFarland
Somis Service Station	H. E. Morris
Aggen	F. M. Aggen
Honda	Mrs. W. Miller
B. I. Co.	A. M. Mullinix
Goodyear	Mrs. W. E. Goodyear
Bishop	C. C. Durham
Puerta Zuela	J. Frietas
Diedrich	Louis J. Diedrich

	Observer
McCormick	SCS
Gill	SCS
Ford	SCS Recording Rain Gage
McCormick	SCS Recording Rain Gage
CCC Camp #1	SCS
B. I. Co.	SCS Recording Rain Gage

Ranch or Locality	Observer
R. O. Mahan	SCS
Gill	SCS
M. B. Hitch	SCS (2 gages)
Aggen	SCS Recording Rain Gage
Stockton	SCS Recording Rain Gage
Bishop	SCS Recording Rain Gage

Distribution of Rainfall

As season follows season these records will become increasingly valuable, forming the basis for predicting the amount and distribution of rainfall. The reason for using a large number of gages in this area is because rainfall is spotted. Gages one-quarter of a mile apart may show as much as one-half inch difference in precipitation.

Valuable rainfall data have been secured from the Snyder ranch covering a period of 45 years.

Other projects in Region 10, California-Nevada, that have gaging stations are:

Caging Stations

Corralitos - 24, 3 of which are of recording type.
English Hills - 7, 1 of which is of recording type.
Placerville - 5, 1 of which is of recording type.
Sebastopol - 6, 1 of which is of recording type.
Aliso Creek - 18.
Lompoc - 4.
Vista - 3.
Nevada projects - 10.

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COOPERATION

Some people feel that soil erosion control is strictly a problem for the Government to solve, the individual merely consenting to having his land worked on. Such a negative attitude towards the program misses the point entirely. The program implies real cooperation on the part of both parties. The cooperator is supposed to aid with materials, teams, and tractors, to the best of his ability. In addition, after control work is put in, the cooperator should see to it that terraces and other structures are kept in repair, and recommended erosion control practices followed.

PLANNING FOR EROSION CONTROL ON A FARM

By Raymond N. Ellis, In Charge,
Section of Erosion Control Practices
Region 10

In order to draw an adequate plan for the control of erosion on an individual farm, certain factors must first be determined. These factors are soil types, slopes, degree of erosion, crops, types of farming operations and the extent and character of the drainage areas involved.

Soil Types

We need to know the soil types on account of the great variation in erosiveness and water-absorbing capacities of soils.

Slope

It is hardly necessary to state that slope is an important factor, as it is self-evident that slope will govern,to a large extent, the degree of erosion.

Erosion

The degree of erosion is noted because it may be the chief determining factor in deciding the type of treatment to be recommended. Where erosion has advanced too far, rather drastic measures may be required.

Crops

The kinds of crops must be known because of their growth habits. If a crop is at its maximum growth during the rainy season it will reduce erosion materially, and it is possible that a simple rearrangement of crops may solve the problem.

Types of farming operations are important, because such practices as contour cultivation, contour sub-soiling, rough plowing, etc., may do much to conserve water and reduce run-off.

The extent and character, including the type and amount of vegetative cover, of the drainage areas involved, need to be ascertained in order to estimate the amount of water draining over the farm under consideration.

Erosion Control Plan

When these factors have been determined a plan for erosion control is drawn, keeping in mind that certain objectives must be attained:

1. Keep the water where it falls, insofar as may be possible, and get it into the soil.

2. Maintain the net return from the property, or increase it if possible, through better farming practices and prevention of soil wastage.

3. Provide for control of excess or run-off water through mechanical means, slowing it down to non-cutting velocities.

4. Dispose of all other excess water as easily and as economically as possible.

Vegetative Cover

Naturally, a good vegetative cover of grass, trees, shrubs, etc., is the best preventive of erosion. Winter cover crops have always proven effective for this purpose as well as for soil improvement. A permanent cover of grasses, used for pasture, is always effective if not over-grazed, and obviously forest trees, brush, and similar growth make effective control. But sometimes the use of such "natural" control methods will not work into a profitable farming scheme, so we must then look for other methods of control.

Terraces of various types, used in conjunction with certain cultural operations, will accomplish much toward water conservation and erosion control. Contour cultivation, contour sub-soiling, rough fallow on grain lands, and basin listing are types of cultural operations that are always considered.

Run-off

We cannot overlook the fact, however, that much of the rainfall comes in quick, sharp storms, and in most cases there is a considerable run-off, which cannot be stopped on the land itself, and must be conducted to the main waterway with a minimum of cutting. This phase introduces gully control work, which is the most spectacular, though far from the most important, feature of erosion control work.